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ABSTRACT

This secondary-level, competency-based curriculum contains modules for Gardener and Landscape Worker. A companion teacher's guide is available separately--see note. Each module contains a number of West Virginia-validated Gardener and Landscape Worker tasks/competencies with a performance guide listing the steps needed to perform each task, learning activities, and evaluation. Student checklists and handouts may also be provided. Titles of the modules are (1) Occupational Knowledge, (2) Preparing Lawn Seedbed, (3) Sowing Grass Seed, (4) Lawn Care, (5) Disease and Insects: Lawns, (6) Lawn Repair, (7) Planting Trees and Shrubs, (8) Pruning, (9) Tree and Shrub Care, (10) Planting and Care of Flowers, (11) Flower Care, and (12) Tool Maintenance. (YLB)

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ED203091

Student Material

GARDENER AND LANDSCAPE WORKER

Competency Based Education Curriculum

Prepared by:
Diana Long
RCA Education Service

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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CE 029 150

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PREFACE

It is with great pleasure that we bring you another West Virginia competency based education (CBE) curriculum. This Gardener and Landscape Worker curriculum was developed for West Virginia under contract, by RCA Education Service. The effort was coordinated by staff of the Bureau of Vocational, Technical and Adult Education.

The Bureau began advocating competency based education in 1974. Since that time West Virginia has produced over 25 CBE curricula in various occupational areas. We also have a number of CBE curricula currently in the process of being developed and/or fieldtested.

This Gardener and Landscape Worker curriculum was inserviced and disseminated to West Virginia vocational agricultural teachers at regional meetings during the spring of 1980. Additional copies of this curriculum are available from the:

Vocational Curriculum Laboratory
Cedar Lakes Conference Center
Ripley, West Virginia 25271
Telephone: 1-800-642-2670

I trust this material will be of assistance in your program. Any suggestions you may have for improving this curriculum may be sent to our State Curriculum Lab. Through this feedback we plan to continually update and revise our materials.

VOCATIONAL, TECHNICAL AND ADULT EDUCATION

Clarence E. Burdette

Clarence E. Burdette
Assistant State Superintendent of Schools

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Businesses

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Individuals

Ronald King, Barboursville High School

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Virgil Wilkins, Hundred High School

Harold Skidmore II, Calhoun County High School

Purpose of the

GARDENER AND LANDSCAPE WORKER

Competency Based Education Curriculum

This competency based education (CBE) curriculum, with Teacher's Guide, has been developed so that you may adapt any or all of its contents to accommodate your teaching style.

The purpose of this CBE curriculum is to provide you and your advisory committee with a set of West Virginia-validated gardening and landscaping Tasks, along with (1) the Steps needed to perform each task, (2) the Evaluation Standards, and (3) suggested Learning Activities.

Depending on your teaching style, you may want to use this material primarily to assist you in your own teaching plans, or the material has been developed in enough detail so that it may, with proper supervision, be used by your students.

How you use this CBE curriculum is up to you. It has been based on the best horticultural information and material available in 1978-79 in West Virginia and the United States.

STUDENT COMPETENCY SHEETS

STUDENT COMPETENCY SHEET

MODULE 01 — Occupational Knowledge

COMPETENCY 01 — Describe duties common to gardeners and landscape workers.

PERFORMANCE GUIDE

1. Describe the basic duties common to both gardeners and landscape workers.
2. Describe the differences between the two types of workers.

LEARNING ACTIVITIES

1. Read the entry under number 301.687-018, Yard Worker (domestic service) found on page 223 in the 1977 edition of the Dictionary of Occupational Titles. Make a list of the duties a yard worker (gardener) is required to perform. Check your work with your instructor. If it is satisfactory, go on to Learning Activity 2.

2. Read the entry under number 408.161-010, Landscape Gardener, on page 273 in the Dictionary of Occupational Titles. Make a list of the duties a landscape gardener is required to perform. Check your work with your instructor. If it is satisfactory, go on to Learning Activity 3.

3. Write a report describing the differences between a gardener (yard worker) and a landscape worker. Check your work with your instructor. If it is satisfactory, ask for the Evaluation.

EVALUATION

Answer the following questions. You must be 100% correct. You may not use references.

1. List six duties common to both gardeners and landscape workers.
   a. d.
   b. e.
   c. f.

2. List two duties that a gardener (yard worker) may be required to perform that are not required of landscape workers.
   a.
   b.

3. List two duties that a landscape worker may be required to perform that are not required of gardeners (yard workers).
   a.
   b.

ANSWERS--EVALUATION 01/01

1. The answer to question #1 may include any six of the following:
   a. planting lawns (flowers, shrubs, trees)
   b. transplanting flowers (shrubs, trees)
   c. fertilizing lawn (flowers, shrubs, trees)
   d. apply pesticides
   e. pruning
   f. cultivating
   g. weeding
   h. seeding lawns
   i. mowing lawn
   j. trimming
   k. raking
   l. watering
   m. cleaning grounds

2. The answer to question #2 may include any two of the following:
   a. washing and polishing automobiles
   b. painting or whitewashing
   c. cleaning garage
   d. cleaning patio furniture
   e. shoveling snow
   f. cultivating plants in greenhouses
   g. waxing
   h. tending furnaces
   i. grooming or exercising pets

3. The answer to question #3 may include any two of the following:
   a. planning landscaping
   b. grading terrain
   c. sodding
   d. digging trenches
   e. installing drain tiles
   f. repairing concrete or asphalt walks and driveways

STUDENT COMPETENCY SHEET

MODULE 01 — Occupational Knowledge

COMPETENCY 02 — Describe working conditions of gardeners and landscape workers.

PERFORMANCE GUIDE

1. Describe common salary, benefits, and working hours of landscape workers or gardeners.
2. Describe extreme working conditions.

LEARNING ACTIVITIES

1. Contact your local West Virginia Department of Employment Security office or your county's Agricultural Extension agent and write a report describing the following:
   a. current salary ranges for entry-level landscape workers and gardeners
   b. basic benefits currently being offered to entry-level landscape workers and gardeners
   c. typical working hours of landscape workers or gardeners
   d. possibilities of seasonal lay-offs

   Compare your report with the report of another student. If there are major differences, see your instructor. If not, go on to Learning Activity 2.

2. Arrange to spend part of a working day with a landscape worker or gardener in your area. From your questions and observations, make a list of the duties performed and the conditions found, including any required heavy physical labor or exposure to extreme weather conditions. Check your work with your instructor. If it is satisfactory, ask for the Evaluation.

EVALUATION

Prepare a report to be presented either orally or in writing which describes the following:

a. the current salary range, benefits, and working hours of landscape workers or gardeners
b. a typical work day of a landscape worker or gardener
c. extreme working conditions

You may use references. If your report is written, it must be neat and free from spelling errors.

STUDENT COMPETENCY SHEET

MODULE 01 — Occupational Knowledge

COMPETENCY 03 — Describe educational and technical requirements for landscape workers and gardeners.

PERFORMANCE GUIDE

1. Describe general education requirements.
2. Describe technical knowledge and skill requirements.
3. Describe education and technical training opportunities available.

LEARNING ACTIVITIES

1. Contact at least two employers who hire landscape workers or gardeners and make a list of the general education and basic technical skills that they require for entry-level, mid-level, and high-level employees. Compare this list to the training you will have received after you finish this course. Check your work with your instructor. If it is satisfactory, go on to Learning Activity 2.

2. Ask your school counselor for sources of information that you can use to compile a list of additional education and technical training opportunities. Write a report describing these opportunities, making sure to indicate whether these courses are offered by a public school system, a private trade school, a college or university, or through an accredited correspondence course.

3. Talk with your Job Placement Counselor and investigate on-job-training opportunities available for you with the school and other employment. Report orally to your instructor. If your work is satisfactory, ask for the Evaluation.

EVALUATION

Using the information gathered in the Learning Activities, write a report describing the following:

a. your long-range employment goals
b. the education and technical skill level that will be necessary in order for you to reach those goals
c. a plan for acquiring the necessary education and technical skills.

The plan must be feasible and must be written neatly and correctly.

STUDENT COMPETENCY SHEET

MODULE 01 — Occupational Knowledge

COMPETENCY 04 — Describe the economic outlook for gardeners and landscape workers for the next ten years.

PERFORMANCE GUIDE

1. Describe the current job market opportunities for landscape workers and gardeners in West Virginia.
2. Describe projected future job-market opportunities for landscape workers and gardeners in West Virginia.
3. Describe projected salaries and benefits.

LEARNING ACTIVITIES

1. Talk to your school's Job Placement Counselor and ask about the current job market for landscape workers and gardeners. Report your findings to your instructor orally. If your work is satisfactory, go on to Learning Activity 2.

2. Visit your school library or your nearest public library. Ask for the most recent editions of at least three newspapers. Make a list of all the job openings for landscape workers and gardeners that are advertised in the classified advertisement section under "Help Wanted". Compile your list with the lists of other students. Check with your instructor. If your work is satisfactory, go on to Learning Activity 3.

3. Find the entry for "Gardeners and Groundskeepers" in the latest edition of Projections to 1985, published by the Research and Statistics Section of the West Virginia Department of Employment Security. Write a report that describes the following:
   a. the actual number of workers employed in the earliest year reported.
   b. the number of workers projected to be employed in 1985
   c. the percentage of increase or decrease projected

   Check your work with your instructor. If it is satisfactory, go on to Learning Activity 4.

4. Ask your county's Agricultural Extension Agent for sources of information projecting the outlook for salaries and benefits for landscape workers and gardeners for the next 10 years. Report your findings to your instructor. If your work is satisfactory, ask for the Evaluation.

EVALUATION

Prepare a report, to be presented either orally or in writing, that describes the following:

EVALUATION 01/04 (continued)

a. current job market opportunities for landscape workers and gardeners
b. projected future job market opportunities for landscape workers and gardeners
c. projected salaries and benefits

If your report is written, it must be neat and free from spelling errors. You may use references.

STUDENT COMPETENCY SHEET

MODULE 02 — Preparing Lawn Seedbed

COMPETENCY 01 — Take soil samples and interpret soil test analysis.

PERFORMANCE GUIDE

1. Get information from county agent.
2. Select proper sampling tools.
3. Keep out or sample separately all unusual areas.
4. Divide field into areas for sampling.
5. Take soil to plow depth from at least 15 spots for each sample.
6. When spade is used, save soil from middle of slice.
7. Mix well in clean container.
8. Fill out information sheet accurately.
9. Number samples--keep your own records.
10. Read report for pH, lime requirement, available phosphorus, potassium, calcium, and magnesium.

LEARNING ACTIVITIES

1. Attend a guest lecture by your County Extension Agent. Take notes to make sure you know
   a. why test the soil
   b. how to get sample bags and information sheets
   c. where to send samples and information sheets
   d. where your test results may be interpreted
   e. how to ask for repeat test
   f. when to take soil samples
   g. how often to test fields

2. Read pages 61-68 in Working in Plant Science and answer questions 1-7 on page 71. When you are finished, check your answers with your instructor.

3. Complete Student Activities 1 and 2 in Introductory Horticulture. Check your work with your instructor after you complete each activity. If your work is satisfactory, go on to Learning Activity 4.

4. Get soil samples from your instructor. Study each of them until you can identify sandy soil, loam soil, and clay soil by sight and feel. Your instructor will quiz you on each type of soil.

5. Attend a lecture by your instructor on "The pH Balance of Soil". Take notes to make sure you understand these words
   a. potential of hydrogen
   b. neutral
   c. acidity
   d. normal pH ranges

   Be prepared to pass a quiz on the information.

LEARNING ACTIVITIES 02/01 (continued)

6. Attend a lecture by your County Extension Agent on "Understanding Soil Analysis". Take notes to make sure you know how to read the reports and interpret the results. Your instructor will give you sample reports. In your own words, report what each test recommends. Check your work with your instructor.

7. Attend a lecture by your instructor in "Taking a Soil Sample". After the lecture you will be given areas to practice taking samples. For each area you sample, check with your instructor after you have
   1. selected the tools
   2. divided field into areas
   3. taken the 8th sample
   4. filled out the information sheet.

   When you are ready, ask for the Evaluation.

EVALUATION

Given a 400 sq.ft. area to be sampled, analysis of the ground, and the tools and materials, take a soil sample of the area. You must take a minimum of 15 samples at plow depth. You must interpret the soil analysis given to you.

STUDENT COMPETENCY SHEET

MODULE 02 — Preparing Lawn Seedbed

COMPETENCY 02 — Prepare a seedbed for lawn areas using tiller and tractor.

PERFORMANCE GUIDE

1. Remove debris if necessary.
2. Till area.
3. Apply plant food over entire area.
4. Till plant food into soil.
5. Rake soil surface smooth.

LEARNING ACTIVITIES

1. View the filmstrip Techniques in Land Preparation: Part One: Seedbed Preparation. Answer the following questions.
   a. List the four requirements for the perfect seedbed.
   b. How can you test the soil for moisture?
   c. Draw the 2 disk patterns. Explain the advantages of each.
   d. Define compaction layers.
   e. Why are landplanes and floaters used?

   Check your answers with your instructor.

2. Attend a lecture by your instructor on using the tractor, plow, and disk to loosen the subsoil. Practice using the tractor to loosen the subsoil 6-12 inches. Demonstrate 2 disk patterns to your instructor. When your work is satisfactory, go on to Learning Activity 3.

3. Attend a lecture by your instructor on applying plant food. You will be given a soil sample and reports for an area of ground. You will compute the amount of food needed. Report to your instructor how you will spread the food.

4. Practice applying plant food over an area assigned to you. Have your instructor check your work. When it is satisfactory, go on to Learning Activity 5.

5. Attend a lecture by your instructor on "Raking". Practice raking surfaces assigned to you by your instructor. When your work is satisfactory, ask for the Evaluation.

EVALUATION

You will be given a soil analysis, plant food, and the tools and equipment you will need. Prepare a seedbed for the lawn using a tiller and tractor. You must mix the correct amount of plant food according to the soil analysis. The seedbed must have a tillage depth of 5"-7", and must have a smooth top surface.

STUDENT COMPETENCY SHEET

MODULE 02 — Preparing Lawn Seedbeds

COMPETENCY 03 — Prepare and apply compost.

PERFORMANCE GUIDE

1. Add 12" layer of material to bin.
2. Wet throughly and pack.
3. Add second layer of different material.
4. Uniformly spread decomposition chemical.
5. Repeat steps 1-4 until desired compost depth is reached.
6. Spread ½ of compost supply over soil area.
7. Till into soil.
8. Spread remaining compost over soil area.
9. Till soil and compost thoroughly.

LEARNING ACTIVITIES

1. Read "Organic Matter" on page 62 in Working in Plant Science. Answer the following
   a. Define organic.
   b. Define humas.
   c. If a soil is fertile, does it have a small or great amount of organic matter?
   d. Explain in your own words the function of organic matter.
   e. Describe the environment that would make organic matter decompose quickly.
   f. Describe the environment that would make organic matter decompose slowly.

2. Attend a lecture/demonstration by your instructor on preparing a compost. Take notes to make sure you know
   a. the purpose of a compost
   b. the time it takes for a compost to be ready to use
   c. the chemicals to use to help speed up the compost.

   Be prepared to pass a quiz on the information.

3. Use your notes from the lecture and the Performance Guide above. Mix a compost. Check with your instructor after each major step. When your work is satisfactory, go on to Learning Activity 4.

4. Attend a lecture/demonstration by your instructor on "Applying a Compost". Take notes to make sure you know
   a. how much compost to use
   b. how to spread the compost evenly
   c. the depth to till the compost into the soil.

   Be prepared to pass a quiz on the information.

LEARNING ACTIVITIES 02/03 (continued)

5. Practice applying compost to an area using your notes from the lecture and the Performance Guide. Check with your instructor after each major step. When your work is satisfactory, ask for the Evaluation.

EVALUATION

You will be given a bin of compost and the tools you will need. Spread and till the compost into a given soil area. The compost should be spread evenly and mixed well into the soil. You will prepare a compost to replace what you used. Alternate layers of organic materials should exist and the top layer should be level.

STUDENT COMPETENCY SHEET

MODULE 03 — Sowing Grass Seed

COMPETENCY 01 — Select and mix grass seed for establishing a lawn.

PERFORMANCE GUIDE

1. Identify need for grass.
2. Identify climate and soil type.
3. Select proper grass seed.
4. Identify package contents in commercial seed.

LEARNING ACTIVITIES

1. Read "Grass Plant" on page 36 in Working in Plant Science. Sketch the parts of the leaf and the parts of the stems. For each part, explain its main function.

2. Pass a quiz on the following:
   a. how grasses form their branches
   b. how grasses grow
   c. definition of intercalary growth
   d. definition of jointing
   e. how a grass leaf grows
   f. how grasses repair and replace a damaged leaf

3. Attend a lecture by your instructor on the reproduction of grass. Take notes and be prepared to pass a quiz on the information.

4. Read pages 209-212 in Working in Plant Science. Complete the following:
   a. Sketch the inforscense, spikelet, and leaf of Smooth Brome grass. Describe why it is very useful and any special requirements.
   b. Sketch the inforscense, spikelet, and leaf of Orchard Grass. Describe why it is useful and also its weaknesses.
   c. Sketch the inforscense, spikelet and leaf of Timothy. Describe its strengths and weaknesses.
   d. Sketch the inforscense, spikelet, and leaf of the Fescue. Describe its strengths and weaknesses.
   e. Sketch the inforescence, spikelet, and leaf of Kentucky Blue Grass.
   e. Describe the strengths and weaknesses

5. Grow each type of grass listed above in a flat. Study each of the stages of growth. You will identify each type of grass without using references.

6. Complete "Applying the Facts" on page 74 in Working in Plant Sciences. When you are finished, check your work with your instructor. If it is satisfactory, go on to Learning Activity 7.

LEARNING ACTIVITIES 03/01 (continued)

7. Read pages 398-399 in Introductory Horticulture. Get three different brand names of the same type of seed and compare the contents and price. Compare the purity, percent of germination, other crops, inert matter, weed seed, and noxious weed. Select what you feel will be the best brand of grass seed. Defend your answer.

EVALUATION

You will be given five descriptions of the type of lawn or field wanted and five drawings of grass. You must match the type of grass with the description with 100% accuracy, without using references.

1. Needed for a home lawn which usually stays cool and moist

A.

2. Wanted for a little league baseball field which gets a lot of rain

B.

3. Wanted for a spring pasture. Some grass may be cut early for hay.

C.

4. Wanted to pasture horses summer, fall, and early winter. Water is usually plentiful.

D.

5. Wanted for ground cover to decorate, fill in empty spaces, and prevent erosion. Fertile, cool, moist soil is available.

E.

EVALUATION ANSWERS 03/01

1. B. Kentucky Bluegrass
2. A. Fescues
3. D. Orchard Grass
4. E. Timothy
5. C. Smooth Brome Grass

STUDENT COMPETENCY SHEET

MODULE 03 — Sowing Grass Seed

COMPETENCY 02 — Sow grass seed with hand seeder.

PERFORMANCE GUIDE

1. Pre-soak seed.
2. Mix seed with sand at the rate of 1 part seed to 10 parts sand.
3. Divide the seed into 2 equal parts.
4. Sow first half of seed while walking in north-south direction. Sow the remaining half walking in east-west direction.

LEARNING ACTIVITIES

1. Attend a lecture by your instructor on "Sowing Grass Seed". Take notes to make sure you know
   a. how to mix the seed with a carrier
   b. the directions to sow the seeds
   c. the best way to spread the grass.
   Practice mixing and sowing grass seed.

2. Read the directions for sowing the seed on four different brands of the same seed. Report your findings to the class.

3. Practice sowing sand on a concrete floor. After you have thrown all of the sand check the floor. Has the sand been sown evenly? Sweep all sand and reuse it until you can sow it evenly. When you are ready, ask your instructor for the evaluation.

EVALUATION

You will be given grass seed, a prepared seedbed, and all the equipment you need. Sow the grass by hand. You must receive a satisfactory rating on each item of the student checklist below. You may not use references.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Seed mixed with a carrier with a 1 to 10 ratio.		
2. Seed sown in correct direction.		
3. Seed evenly sown over area.		

STUDENT COMPETENCY SHEET

MODULE 03 — Sowing Grass Seed

COMPETENCY 03 — Sow grass seed mixture with gravity and/or cyclone seeder.

PERFORMANCE GUIDE

1. Inspect the field or land to be seeded to determine the conditions and the type of seeder that should be used.
2. Plant the grass.
3. Clean all tools and equipment and return them to designated place.

LEARNING ACTIVITIES

1. Attend a lecture/demonstration by your instructor on using a gravity seeder. After the lecture, practice loading, operating and cleaning the gravity seeder. When you are ready, demonstrate your skill in operating the gravity seeder to your instructor.

2. Attend a lecture/demonstration by your instructor on using a cyclone seeder. After the lecture, practice loading, operating, and cleaning the cyclone seeder. When you are ready, demonstrate your skill in operating the cyclone seeder to your instructor.

3. Make a list of 5 different lawns in your area. Tell what type of seeder you would use and tell why. Your report may be oral or in writing.

4. Practice sowing seed with cyclone and gravity seeders. When you are ready, ask for the Evaluation.

EVALUATION.

You will be given an area to be seeded. You will select a cyclone and/or gravity seeder and plant grass seed. The seeder must be set to throw the right amount of seed per acre. The seed must be planted evenly over the area. All tools and equipment used must be cleaned and returned to their proper place in the storage area.

STUDENT COMPETENCY SHEET

MODULE 03 — Sowing Grass Seed

COMPETENCY 04 — Finish seedbed after seeding, including raking, rolling, watering, and mulching.

PERFORMANCE GUIDE

1. Cover seeds with hand rake.
2. Apply mulch evenly.
3. Roll seedbed.
4. Water seedbed.

LEARNING ACTIVITIES

1. Read pages 399-400 in Introductory Horticulture and answer the following questions.
   a. How deep do you plant large seeds?
   b. How deep do you plant small seeds?
   c. Why do you use mulch?
   d. How much mulch do you use?
   e. Why do you roll a seedbed?
   f. How often do you water the new seedbed?

   When you are finished, check your answers with your instructor.

2. Practice raking seedbeds that have been sown with large seeds and small seeds. Check your work with your instructor to make sure you are not planting the seeds too deep or too shallow. When your instructor is satisfied with your work, go on to Learning Activity 3.

3. Your instructor will assign you a plot of ground that is level, terraced, and sloping. Describe the mulching material you will use and steps you will follow. Mulch the areas. Check your work with your instructor. When your work is satisfactory, go on to Learning Activity 4.

4. Attend a lecture/demonstration by your instructor on rolling and watering the new seedbeds. Take notes during the lecture/demonstration to find the answers for the following.
   a. What is the least the roller should weigh?
   b. What is the most the roller should weigh?
   c. How many times a day should you water the area?
   d. How long should you water the area?
   e. Why should you water the area less times and use more water as the area becomes covered with grass?

   Be prepared to pass a quiz on the above questions.

EVALUATION 03/04

Given a seedbed sown with grass, select the tools you will use and finish the seedbed. Seeds must be covered 1/4"-3/8" if large, and 1/8"-1/4" if small. 25% of the area must be covered with mulch and a cover must be used on sloping banks. Seedbed must be rolled with no more than 50 lbs. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 04 — Lawn Care

COMPETENCY 01 — Care for lawn until first cutting, including watering and application of fertilizer.

PERFORMANCE GUIDE

1. Identify fertilizer needs.
2. Apply fertilizer
3. Identify soil texture, drainage and permeability.
4. Identify amount of natural water supplys to lawn.
5. Set up sprinkling systems.
6. Water lawn as needed.

LEARNING ACTIVITIES

1. Attend a lecture by your instructor on "Applying Lime and Fertilizer". Take notes during the lecture and answer the following questions.
   a. What is the pH range for most lawns?
   b. How fast does lime work its way down into the soil?
   c. What type of fertilizer is needed anually?
   d. Define urea form of nitrogen.
   e. What happens if you use an inorganic fertilizer on wet growing grass?
   f. When is the best time to apply fertilizer on cool season grasses?

   Be prepared to pass a quiz on the information.

2. Attend a lecture by your County Extension Agent on "Water Holding Capacity". Take notes on the following.
   a. Define wilting point.
   b. How to find out the amount of water available according to the soil texture.
   c. How to find out the amount of water due to the "surface runoff".
   d. Define internal drainage and permeability. Describe how it affects how often you have to water the soil.

   Be prepared to pass a quiz on the information.

3. Study five different plots of ground and describe how often you should water the lawn according to the texture, internal drainage, and permeability.

4. Contact your local weather bureau and report on the following.
   a. How humidity affects watering needs.
   b. How evaporation affects watering needs.
   c. Average rainfall for the areas during the growing season and how this affects watering needs.

   Report your findings to your instructor orally or in writing.

5. Attend a lecture/demonstration by your instructor on common sprinkling systems and gauging one inch of water. After the lecture, practice setting up the watering systems. Demonstrate your work to your instructor. If it is satisfactory, ask for the Evaluation.

EVALUATION

Given a prepared seedbed, care for the seedbed until it is ready for its first cutting. You must file a report in which you describe:

a. when you will apply fertilizer and lime and the amount
b. identify the water holding capacity due to soil texture, internal drainage, and permeability
c. effects weather will have on your care of the seedbed.

The lawn must grow without burning, or over/under watering.

STUDENT COMPETENCY SHEET

MODULE 04 — Lawn Care

COMPETENCY 02 — Mow grass with reel type mower and rotary mower.

PERFORMANCE GUIDE

1. Set height of mower blade.
2. Perform preliminary machine maintenance as specified in manufacturer's manual.
3. Perform preliminary engine maintenance as specified in manufacturer's manual.
4. Determine starting point and direction of travel.
5. Clear area of rocks, sticks, bottles, cans, and other debris which could cause injury to you or to bystanders.
6. Start engine.
7. Engage controls.
8. Mow grass.

LEARNING ACTIVITIES

1. Read pages 409-410 in Introductory Horticulture. Answer the following.
   a. What type mower is best for close mowing (½")?
   b. What mistake do most homeowners make in mowing their lawn?
   c. List two problems that are caused by cutting the lawn too short.
   d. What is the maximum amount that should be cut off at one time? Why?
   e. Draw a diagram of how to cut a lawn.
   f. What is thatch?

   Be prepared to pass a quiz on the information.

2. Attend a lecture by your instructor on safety precautions to use when working with or around a mower. You must observe these precautions at all times.

3. Attend lecture/demonstration by your instructor on operating a rotary mower. Take notes on how to do the following.
   a. Adjust the blade heighth.
   b. Perform machine maintenance.
   c. Perform engine maintenance.
   d. How to sharpen blades.
   e. Start the engine.
   f. Engage controls.

   Practice each of these steps until you can do so without using references. Demonstrate your skill to your instructor.

LEARNING ACTIVITIES 04/32 (continued)

4. Attend a lecture/demonstration by your instructor on operating a reel type mower. Take notes on how to do the following.
   a. Adjust the blade heighth.
   b. Perform machine maintenance.
   c. Perform engine maintenance.
   d. How to sharpen blades.
   e. Start the engine.
   f. Engage controls.

   Practice each of these steps until you can do so without using references. Demonstrate your skill to your instructor.

5. Find the faults of a reel type and rotary mower during preliminary maintenance. Your instructor will tell you how many problems there are on each mower. You must identify all of the problems.

6. Identify four lawns in your area that have not been mowed correctly. Tell what needs to be done to correct each of the lawns.

7. Practice cutting lawns with both the reel type and rotary mower. When you are ready, ask for the Evaluation.

EVALUATION

You will be given a grass lawn area, a reel type mower, a rotary mower, and the manufacturer's manual. Mow the lawn. You must receive a satisfactory rating on each item of the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Selected proper mower for the job.		
2. Performed preliminary maintenance.		
3. Cleared area of all debris.		
4. Operated mower according to manufacturer's recommendations.		
5. Cut grass height within ± ½" of the recommended height.		
6. Observed all safety precautions.		
7. Cut grass in proper direction.		

STUDENT COMPETENCY SHEET

MODULE 04 — Lawn Care

COMPETENCY 03 — Select and apply fertilizer to established lawn areas.

PERFORMANCE GUIDE

1. Select equipment needed.
2. Select spreader (cyclone), wheel, or sprayer.
3. Select fertilizer after reading soil analysis.
4. Calibrate spreader.
5. Apply fertilizer without stripping spaces or overlapping.
6. Clean and store spreader.

LEARNING ACTIVITIES

1. Attend a lecture/demonstration by your instructor on using a cyclone spreader. After the lecture, practice filling, adjusting, applying, and cleaning the spreader. When you are ready, demonstrate this skill to your instructor.

2. Attend a lecture/demonstration by your instructor on using a wheel (push type spreader). After the lecture, practice filling, adjusting, applying, and cleaning the wheel. When you are ready, demonstrate this skill to your instructor.

3. Attend a lecture/demonstration by your instructor on using a sprayer. After the lecture, practice filling, adjusting, applying, and cleaning the sprayer. When you are ready, demonstrate this skill to your instructor.

4. Identify a lawn in your area that has been over-fertilized, one that needs fertilized, and one that has been fertilized incorrectly.

5. Make a display which illustrates the job for which each type of spreader is best.

EVALUATION

Given an area that needs fertilized and a soil analysis, you will select the best spreader and apply the fertilizer. The amount of fertilizer applied must not be more than ± 10% from the needed amount. The fertilizer must be applied without stripping places or overlapping. The spreader must be cleaned and all moveable parts oiled.

STUDENT COMPETENCY SHEET

MODULE 05 — Disease and Insects: Lawns

COMPETENCY 01 — Identify diseased grass.

PERFORMANCE GUIDE

1. Inspect the area.
2. Identify those portions of the area where disease is evident.
3. Determine the nature and seriousness of the disease.
4. Report findings.

LEARNING ACTIVITIES

1. Attend a lecture by your instructor or Department of Agriculture representative on nonparasitic causes of plant disease. After the lecture, list three examples of these major causes of nonparasitic causes:
   a. air pollution
   b. climate
   c. chemicals
   d. culture

   Compare your list with your class. Make one big list combining all of the different examples.

2. Attend a lecture by your instructor or Department of Agriculture representative on nonparasitic causes of disease. Sketch an example of each of the following:
   a. fungi--root rots, wilts, powdery mildew
   b. bacteria--leaf spots, soft rots, gall
   c. viruses--mosaics, dwarfing
   d. nematodes--root knot nematode

3. Pass a quiz on the definitions of the following words:
   a. nonparasitic disease
   b. fungi
   c. bacteria
   d. viruses
   e. nematodes

4. Attend a lecture by your instructor or Department of Agriculture representative on symptoms of plant disease. Take notes and describe each of the following:
   a. mildew
   b. shoot blight
   c. leaf spots
   d. twig blight
   e. crown galls
   f. root knots
   g. root rot

LEARNING ACTIVITIES 05/01 (continued)

h. wilt
i. canker
j. fruit rot

Find a sample of three of the diseases above and bring it to class.

5. Read pages 99-103 in Working in Plant Science. Answer the following:
   a. Define plant pathology.
   b. Define necroses.
   c. Define stunting, dwarfing, and hypoplasia.
   d. Define plant pathogens.
   e. Describe the ways pathogens may enter plants.
   f. Define damping off.
   g. List some examples of fungi.
   h. List some examples of bacteria.
   i. List some examples of virus.
   j. List the effects nematodes can have on plants.

   Be prepared to pass a quiz on the information.

6. Read page 411-412, "Lawn Diseases and Their Control" and "Disease Prevention", in Introductory Horticulture. In your own words, describe how fungus diseases are spread and how to prevent them.

7. Read Landscape Facts: Thatch Removal in Lawns and answer the following:
   a. What is thatch?
   b. Why is it found on high quality lawns rather than poor lawns?
   c. Why is thatch dangerous to a lawn?
   d. Why does fertilizer increase the thatch on a lawn?
   e. What type of soil is a good home for thatch?
   f. Why should thatch not be removed as a routine practice?
   g. When is the best time to remove thatch?

   Check your answers in a class discussion.

8. In your area, find a lawn that has a thatch problem. Report on the causes of the thatch (soil acidity, drainage, fertilization) and how you would correct the problem.

9. Read Pest Information Series 38: Fading-out of Lawns. Answer the following:
   a. What is "fading-out"?
   b. What causes "fading-out"?
   c. What are the symptoms?
   d. What is the best "preventative" cure?
   e. What is the best way to treat a lawn that has fading-out?

   Check your answers with your instructor.

LEARNING ACTIVITIES 05/01 (continued)

10. Find a lawn in your area that has "fading-out". Identify the cause of the disease.

11. Read Landscape Facts: Helminthosporium Leaf Spots. Be prepared to pass a quiz on the symptoms, causes, and treatments of the disease. You must score 80%.

12. Read Landscape Facts: Flag and Stripe Smut on Turf. Make a display which shows the symptoms, causes, and control of the disease.

13. Read pages 3-4, "Brown Patch", in Lawn Diseases. In your area find a lawn that has brown patch. Report on how you identified the fungus, and its causes.

14. Read pages 8-14 in Lawn Diseases. Make a chart showing the symptoms and control of Powdery Mildew, Fusarium Blight, Red Thread, Copper Spot, Ophrobolus Patch, Snow Molds, Mushrooms, and Fairy Rings. Check your work with your instructor. If it is satisfactory, ask for the Evaluation.

EVALUATION

You will answer the following questions on identifying diseased grass with 80% accuracy without using references.

Fill in the blank for questions below.

1. _____ causes most of the serious and sidespread diseases of lawns.

2. _____ fungus makes reddish-brown to purplish-black spots on leaves and stems of Kentucky Bluegrass.

3. _____ is one of the most common lawn diseases in warm and humid parts of the U.S.; it can do the worst harm after you use a lot of nitrogen fertilizer.

4. Brown patch can be identified by _____
_____

5. Another name for Dollar Spot is_____.

6. Gray or black stripes on a leaf blade means the plant might have_____.

7. It is easier to see stripe smut on leaves_____.

8. Plants with _____ look like they have a cottony growth on the leaves. As the leaves die, they turn light brown and cling together.

9. Circles of dark green grass aroung light colored or dead grass is called _____.

EVALUATION 05/01 (continued)

10. Lawns can be cured of this disease by sweeping with a broom or spraying with a strong stream of water. It is _____.

11. Another name for leaf spot helminthosporium is _____.

12. Slime molds are not _____, rather they use the grass for physical support.

Complete the following.

13. Thatch is _____.
_____.

14. List two effects thatch has on lawns.
a. _____
b. _____

15. List five other causes of poor lawns other than fungi.
1. _____
2. _____
3. _____
4. _____
5. _____

Below you will find five descriptions of a lawn. From the information given, list the fungus or problem.

16. This lawn has been given proper amounts of fertilizer at the correct times. The owners admit they have not mowed the lawn properly all the time, and often they will mow it shorter than recommended so they will have more time between mowings. A soil analysis shows the soil is very acid. _____

17. This lawn has been growing well, but lately there has been a lot of rain and humid weather. There appear to be blue-gray powder on some of the blades. The affected grass is scattered in groups and rings in areas several feet in diameter. _____

18. Early in the morning you can see wilted circular areas on this lawn. There is a "smokey ring" of blackened grass around large areas of light brown grass. _____

19. At first, this lawn appears to have grass blades that are pale green. When you look closer, there are yellow-green streaks in the leaves. Later on a black, soot-like dust rubs off the stripes. _____

20. This lawn was a good example of bluegrass. Then one day the owner noticed the grass was beginning to thin out and had a brown undercoat. When the owner looked closer, it was found that the undercoat was caused by dead grass blades. There was also brown and purple spots on the leaves.
_____

ANSWERS--EVALUATION 05/01

1. fungi
2. Helminthosporium leafspot
3. brown patch
4. ". . .development of irregular circular areas a few inches to several feet in diameter with a brownish discoloration".
5. small brown patch
6. stripe smut
7. during cool weather in spring and fall
8. snow mold
9. fairy rings
10. slime molds
11. melting out, fading-out, or dying out
12. parasites
13. layer of living and dead organisms that develops between the layer of green vegetation and the soil surface
14. increased disease susceptibility
    restricted rooting
    less resistance to drought and other environmental stress conditions
    reduced air, water, and fertilizer
15. insect injury
    fertilizer burn
    pesticide injury
    dog urine injury
    improper mowing
    improper watering
    buried debris
    compacted soil
    accumulation of runners
16. thatch layer
17. slime molds
18. brown patch
19. flag and stripe smut
20. leaf spot (helminthosporium)

LEARNING ACTIVITIES 05/02 (continued)

7. Inspect lawns assigned to you by your instructor for insect and/or pest damage. Report the type of insect and/or pest and the extent of the damage. You may use any references.

EVALUATION

You will answer the following questions with 90% accuracy. You may not use references.

1. List the four stages of metamorphosis.
   a.
   b.
   c.
   d.

2. List the three body sections of an adult insect.
   a.
   b.
   c.

3. True or False--All insects have four wings. ____

4. List four signs of insect or pest damage.
   a.
   b.
   c.
   d.

5. If the grass around your sidewalk and driveway began to die, you would test for _____.

6. This insect is relatively new and has been found mainly in the northeastern United States. _____

7. This insect puts its beak into the grass plant, shoots in a poison and sucks the plant juice. _____

8. The larvae stage of this insect's life causes the most damage to bent and bluegrass. _____

9. This insect burrows down through a stem and eats at the node just above the root collar. _____

10. These insects hibernate in the winter. You can fold back the turf to check for this insect because it eats the grass roots. _____

STUDENT COMPETENCY SHEET

MODULE 05 — Disease and Insects: Lawns

COMPETENCY 02 — Identify grass damaged by insects and other animal pests.

PERFORMANCE GUIDE

1. Inspect the area.
2. Identify the insect(s).
3. Appraise the seriousness of insect damage.
4. Report findings.

LEARNING ACTIVITIES

1. View the filmstrip Applying Pesticides: Recognizing Pests and Pesticides. Be prepared to pass a quiz on the following information.
   1. the parts of an adult insect
   2. the four stages of insect development

2. Prepare a report on how insects are helpful to the environment. Your report may be oral or written. You must use at least two references.

3. Read pages 107-108, "How Insecticides Attack Insects", in Working in Plant Science. When you are finished reading, list three examples of insects that can be killed by using
   a. stomach poisons
   b. contact poisons
   c. fumigant poisons
   d. systemic poisons

4. Attend a lecture by a County Extension Agent on inspecting grass for insects. Bring in three examples of the following:
   a. chewed or frayed blades
   b. frass or webbing

   Be prepared to pass a quiz on the information.

5. For each of the insects listed below, write a report which describes the insect, how it attacks the plant life cycle, and how to test for the insect. You may use any references you can find, but be sure to write the reports in your own words.
   a. chinchbugs
   b. hyperodes weevil
   c. sod webworms
   d. white grubs

6. Prepare a report on how the following pests can damage lawns:
   a. mice, moles
   b. birds
   c. racoons
   d. mites, ticks, spiders, metipedes
   e. snails and slugs

You may use references.

Identify the following insects:

11.

A

Eggs

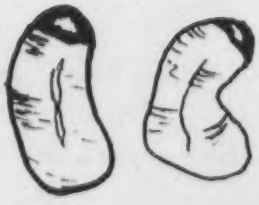
B

Immature Stage

C

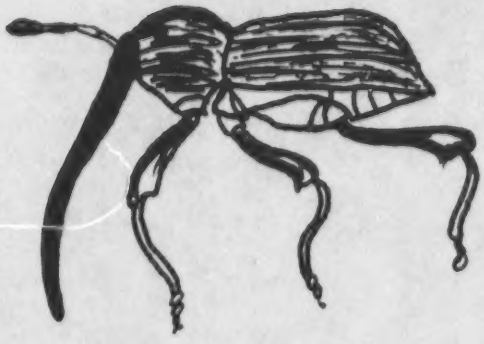
Winged Adult
1/5" long

12.



A

Larvae

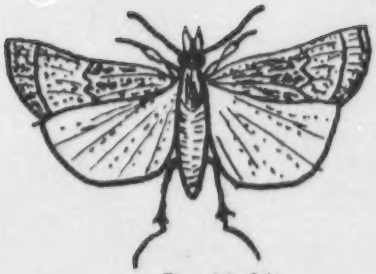


B

Adults

13.

A. Larvae
(worms)
3/4" long



B. Adult
(miller)

14.

A. Larvae
(grubs)

B. Adult
(May Beetles or June Bugs)

ANSWERS--EVALUATION 05/02

1. egg
   larva
   pupa
   adult

2. head
   thorax
   abdomen

3. false

4. thinned grass strands
   dying or dead patches
   discolored or withered blades
   chewed or frayed blades
   frass or webbing
   small holes, mounds, or burrows
   animal and/or bird droppings

5. chinchbugs

6. Hyperodes Weevil

7. Chinchbugs

8. Sod Web Worms

9. Hyperodes Weevil

10. White Grub

11. Chinch bug

12. Hyperodes Weevil

13. Sod Webworm

14. White Grub

STUDENT COMPETENCY SHEET

MODULE 05 — Disease and Insects: Lawns

COMPETENCY 03 — Mix insecticide, herbicide, and fungicide.

PERFORMANCE GUIDE

1. Calculate the square footage to be covered by the herbicide, insecticide, and/or fungicide.
2. Measure the herbicide following the manufacturer's specifications.
3. Fill tank to required level with water and engage the agitator.
4. Add chemicals slowly in the prescribed amounts.
5. Check to make sure the chemicals are dissolved.
6. Destroy used cartons and return leftover materials to storage.

LEARNING ACTIVITIES

1. View the filmstrip Selecting Pesticides and read pages 14-18 in Applying Pesticides: Management Application Safety. Find examples of the following:
   a. danger signal word
   b. warning signal word
   c. caution signal word
   d. pesticide which exposes pests through mouth, contact, or by breathing
   e. brand name of a liquid EC
   f. brand name of a solution
   g. brand name of a flowable
   h. brand name of a fumigant
   i. brand name of an aerosol
   j. selective pesticide
   k. non-selective herbicides

2. Attend a lecture by a person from the Environmental Protection Agency (EPA). Write a report on how the regulations will affect you, once you are working.

3. Pass the quiz on pages 5-10 in Applying Pesticides: Student Workbook. You must 80% on the quiz.

4. View the filmstrip Handling Pesticides Safely. You must observe these safety precautions at all times. Pass a quiz on the information with 80% accuracy.

5. Read pages 73-80 in Applying Pesticides: Management Application Safety. Work the problems for Acre-Volume Method, and Time-Volume Method on pages 76-79. When you are finished, check your answers with your instructor.

LEARNING ACTIVITIES 05/03 (continued)

6. Read pages 79-81 in Applying Pesticides: Management Application Safety. Practice mixing liquid emulsions and wettable powder. When you are ready, demonstrate these skills for your instructor:
   a. procedure for mixing liquids
   b. mix a slurry
   c. add slurry to tank

EVALUATION

You will be given an area of land, directions for pesticides, and the equipment you will need. Compute the amount of pesticide to use and mix it according to the manufacturer's directions. You must destroy used cartons and return leftover materials to storage.

STUDENT COMPETENCY SHEET

MODULE 05 — Disease and Insects: Lawns

COMPETENCY 04 — Control disease, weeds, and insect damage on established lawns by applying insecticides, herbicides, and fungicides.

PERFORMANCE GUIDE

1. Identify disease, weed, or insect causing damage.
2. Identify insecticide, herbicide, or fungicide to treat lawn.
3. Compute acreage or square footage of the area.
4. Compute amount of chemical to apply.
5. Mix chemical.
6. Apply chemical observing all safety precautions.
7. Clean all equipment and return it to its proper place.
8. Destroy used cartons and other containers.

LEARNING ACTIVITIES

1. View the filmstrip "Type and Size of Sprayer to Use". Answer the questions on page 13-14 in the student workbook. When you are finished, check your work with your instructor. If it is satisfactory, go on to Learning Activity 2.

2. Attend a lecture/demonstration by your instructor on the parts of a sprayer and the types of granular applicators. Study the parts until you can identify each of the parts without using references.

3. View the filmstrip "Applying Pesticides: Operating Sprayers". Answer the questions on page 15, 20, and 21 in the student workbook. When you are finished, check your answers with your instructor.

4. Attend a lecture/demonstration by your instructor, "Preparing the Sprayer for Operation". Practice the following steps until you are ready for your instructor to check your work.
   a. Lubricate the spray.
   b. Inspect the pump, tank, nozzles, strainers, hoses, piping, and gauges.
   c. Adjust the nozzle spacing and height.
   d. Adjust the operating pressure.
   e. Check the sprayer for proper operation.

5. Inspect sprayer given to you by your instructor. Each of the sprayers have been fixed so there **are at least** two malfunctions on each one. Find the errors in the equipment without using references. When you have identified each of the errors, go on to Learning Activity 6.

LEARNING ACTIVITIES 05/04 (continued)

6. Read pages 18-20 in Lawn Diseases. This chart should be used to help you identify the correct fungicide to use in treating the disease. Use the chart and identify the type of fungicide to use to treat your school lawn for each of these lawn diseases.
   a. copper spot
   b. helminthosporium
   c. powdery mildew
   d. slime molds
   e. stripe smut

   List the fungicide, how much you would use and how often. Check your work with your instructor.

7. Visit an agribusiness in your area and identify the insecticide to use to kill
   a. chinchbugs
   b. hyperodes weevil
   c. sod webworms
   d. white grubs

   Use the area of your school lawn and list the insecticide, how much you would use, and how often. Check your work with your instructor.

8. Collect a sample of each of the following weeds and display them with identifying labels. You may use references. Check your work with your instructor.
   a. chickweed
   b. knot weed
   c. annual bluegrass
   d. crabgrass
   e. dandelions
   f. wild garlic
   g. plantain
   h. hawkweed
   i. red sorrell

9. Visit an agribusiness in your area and identify the herbicide that you would use to kill each of the weeds listed in Learning Activity 8. List the herbicide, how much you would use, and how often. Check your work with your instructor.

10. Attend a lecture by your County Extension Agent on environmental concerns in using insecticide, herbicide, and gungicide. Take notes to make sure you know
    a. steps to reduce drift and vaporization
    b. how to control pesticide movement
    c. how to combine insecticides, fungicides, and/or herbicides

    Be prepared to pass a quiz on the information.

EVALUATION 05/04

You will be assigned a lawn which is damaged by insects, weeds, and/or disease. You must treat the lawn until the problem is corrected. You may use references. You must receive a satisfactory rating on each item of the student checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Problem identified correctly.		
2. Proper insecticide, herbicide, fungicide selected.		
3. Used equipment correctly and safely.		
4. Applied correct amount of chemical.		
5. Stored all unused chemicals correctly.		
6. Corrected the problem without causing further damage to the lawn.		
7. Considered environment when applying insecticide, herbicide, or fungicide.		
8. Cleaned and stored equipment properly.		

STUDENT COMPETENCY SHEET

MODULE 06 — Lawn Repair

COMPETENCY 01 — Renovate worn spots in lawns by filling holes and depressions.

PERFORMANCE GUIDE

1. Load wheelbarrow with soil.
2. Locate holes and depressions in lawn.
3. Mark all holes and depressions.
4. Fill each hole with top soil and compact. slightly to prevent washing and settling.
5. Rake topsoil to contour of areas.

LEARNING ACTIVITIES

1. Read "Loosened Grass" on page 413-314 in Introductory Horticulture. Select three lawns in your area and report wh you would roll the grass and how much weight you would use.

2. Make a list of the different materials you could use to mark holes on a lawn. Show your list to your instructor.

3. Attend a lecture/demonstration by your instructor on contours. Take any notes you feel necessary. Be prepared to pass a quiz on the information.

4. Using your notes from the lecture and the Performance Guide, practice filling in holes and depressions in lawns. Check your work with your instructor after each major step. When you are ready, ask for the Evaluation.

EVALUATION

Given the topsoil and the tools you will need, you will fill all holes and depressions in a lawn. The topsoil must match the contour of the area when packed. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 06 — Lawn Repair

COMPETENCY 02 — Aerate sod.

PERFORMANCE GUIDE

1. Set equipment for operation.
2. Determine direction of travel.
3. Cover area completely with aerator.
4. Clean tines, as necessary.
5. Replace broken tines as necessary.

LEARNING ACTIVITIES

1. Attend a lecture/demonstration by your instructor on aerating the soil. Take notes to make sure you know
   1. what type of soils need aeration
   2. why water is used
   3. why spading forks or spiked aerator should not be used
   4. finishing practices after soil has been aerated.

   Be prepared to pass a quiz on the information.

2. Following the notes you took from the lecture and the performance guide, practice aerating the soil. Have your instructor check your work.

3. Attend a lecture/demonstration by your instructor on cleaning and repairing aerating equipment. All used equipment must be cleaned and in good repair when stored.

4. Select a lawn in your area that has compacted soil. Prescribe a treatment for the lawn by describing how you will aerate the soil, how often, and any dressings you will use after aerating. Check your work with your instructor. If your work is satisfactory, ask for the Evaluation.

EVALUATION

You will be given a compacted lawn and an aerator. You will aerate the soil so that there are soil cores distributed evenly over the area. You may not use references and you must clean all equipment before storing. If aerator is damaged, all repairs must be made before storing.

STUDENT COMPETENCY SHEET

MODULE 06 — Lawn Repair

COMPETENCY 03 — Remove and replace damaged turf.

PERFORMANCE GUIDE

1. Till soil to shallow depth and rake smooth.
2. Carefully unroll sod and place pieces in staggered, checkerboard pattern.
3. Join edges of sod firmly.
4. After all sod has been placed on area, roll or tamp area.
5. Thoroughly water sod after rolling.
6. Water sod regularly until rooted.

LEARNING ACTIVITIES

1. Attend a lecture/demonstration by your instructor on laying sod. Take notes to make sure you know how to
   a. Prepare the seedbed.
   b. Handle rolls of sod.
   c. Unroll and place sod.
   d. "Seal" the sod.
   e. Water the sod.

   Be prepared to pass a quiz on the information.

2. Prepare a report on the price of sod by seasons and brand. Use at least two different sources. Include in your report:
   a. factors which make the price go up and down
   b. advantages and disadvantages of each type of sod
   c. availability of sod
   d. guarantees that come with sod

3. Attend a lecture/demonstration by your instructor on operating a sod cutter. Take notes to make sure you know how to
   a. check oil level and lubrication of sod cutter
   b. level cutting bar
   c. cut sod to specifications
   d. clean sod cutter.

   Practice the above and when you are ready, demonstrate your skill to the instructor.

4. Follow the steps in the Performance Guide and your lecture notes. Practice removing and replacing damaged turf. Check with your instructor after these steps.
   1. old turf removed
   2. seedbed prepared
   3. sod rolled
   4. sod watered

   When your work is satisfactory, ask for the Evaluation.

EVALUATION 06/03

You will be given the tools you need and the sod. Remove and replace damaged turf on an established lawn. Newly sodded areas should look like a brick wall design and be rooted in three or four weeks. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 06 — Lawn Repair

COMPETENCY 04 — Repair sod by sprigging and plugging.

PERFORMANCE GUIDE

1. Prepare seedbed for planting.
2. Select method to repair sod.
3. Mark off area for proper spacing.
4. Sprig or plug the area.
5. Roll the area.
6. Clean equipment and store.
7. Irrigate area until sod is well established.

LEARNING ACTIVITIES

1. Read pages 401-403 in Introductory Horticulture and answer the following questions.
   a. Define plugging.
   b. Define sprigging.
   c. Explain the difference between sprigging and stolanizing.
   d. Which method would you use to cover a lawn quickly.
   e. Define strip sodding.

   Check your answers with your instructor.

2. Attend a lecture/demonstration by your instructor on sprigging. Take notes to make sure you know how to
   a. store stolons
   b. compute number of stolons for area
   c. identify the type of grass which can be grown by sprigging.
   d. topdress the area.
   e. roll the area.
   f. water the area.

   Be prepared to pass a quiz on the information.

3. Practice sprigging in a 3' x 3' flat. Follow the Performance Guide and your notes from the lecture. Check with your instructor after each of these major steps:
   a. computing the number of stolons needed
   b. spacing the stolons
   c. topdressing the area
   d. watering the area.

4. Attend a lecture/demonstration by your instructor on plugging. Take notes to make sure you know:
   a. how to prepare the seedbed
   b. best time to use plugging method
   c. grasses which are most often plugged
   d. how to compute number and spacing of plugs
   e. how to use a plug cutter
   f. how to set plugs

LEARNING ACTIVITIES 06/04 (continued)

g. water needs of plugs

Be prepared to pass a quiz on the information.

5. Practice plugging a 3' x 6' area in a flat. Check with your instructor after each of these major steps.
   a. Laying off the rows.
   b. Cutting plug holes.
   c. Setting plugs
   d. Watering plugs.

   When your work is satisfactory, go on to Learning Activity 6.

6. Contact distributors in your area to find out the cost of sprigging and plugging. Report your findings to your class.

7. Plan the methods you would use to repair a damaged lawn assigned to you. Report the following information to your instructor:
   a. method selected
   b. comparison of cost
   c. step by step procedure you will follow until the lawn is repaired.

   If your work is satisfactory, ask for the Evaluation.

EVALUATION

You will be given an area of damaged turf to be reestablished. Select the method (sprigging or plugging) and repair the turf. You must receive a satisfactory rating on each item of the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. proper tools selected		
2. fertilizers and topsoil mixed correctly		
3. spriggs spaced correctly		
4. area rolled correctly		
5. plugs spaced correctly		
6. area watered correctly		

STUDENT COMPETENCY SHEET

MODULE 07 Planting Trees and Shrubs

COMPETENCY 01 Plant trees and shrubs

PERFORMANCE GUIDE

1. Select shrubs and/or trees to be planted.
2. Determine location to plant shrub and/or trees.
3. Dig hole for shrub or tree according to recommendations.
4. Perform necessary pruning before and after setting.
5. Place shrub or tree in hole at recommended depth.
6. Prepare soil to refill hole.
7. Fill bottom of hole with prepared soil in order to set plant at proper depth.
8. Fill hole half full of soil.
9. Fill hole with water and allow it to soak into the soil.
10. Finish filling hole with soil.
11. Build berm around outer edge of hole.
12. Water thoroughly.
13. Stake tree as recommended.
14. Water periodically throughout the first growing season.

LEARNING ACTIVITIES

1. Read pages 330-338 in Introductory Horticulture. Make a notebook with illustrations, pictures or actual leaf samples of small, medium and large deciduous trees listed in Fig. 28-11. All of the trees must be represented. Your work must be neat and meet your instructor's specifications as to size, type of paper etc.

2. Pass a quiz on identifying deciduous trees. You must score 85%. You may not use references.

3. Read "Planting Deciduous Trees" pages 338-342 in Ornamental Horticulture. Complete the Self Evaluation on pages 343-345. Check your answers with your instructor.

4. Read pages 346-353 in Introductory Horticulture. Make a notebook with illustrations, pictures or actual leaf samples of deciduous shrubs less than 3 feet tall, 3 to 6 feet tall and 6 to 10 feet tall listed in Fig. 29-1. All of the shrubs must be represented. Your work must be neat and meet your instructor's specifications.

5. Pass a quiz on the identification of deciduous shrubs. You must score 85%. You may not use references.

6. Attend a lecture/demonstration by your instructor on Planting Bare Root Plants. Take notes to make sure you know:
   a. characteristics of bare root plants.
   b. when bare root plants should be planted.
   c. how to store and protect the plants.
   d. how to prepare the hole.
   e. how to prepare the back fill.
   f. how to prepare the tree or shrub.
   g. how to position the plant.
   h. how to water the plant.
   i. how to complete the planting.

   Be prepared to pass a quiz on the information.

7. Practice planting a bare root plant. Check with your instructor after each major step listed in Learning Activity 6. When your work is satisfactory, go on to Learning Activity 8. Your plant should be centered, soil firm, roots spread with no air pockets.

8. Attend a lecture/demonstration by your instructor on Planting Balled and Burlapped plants. Take notes to make sure you know:
   a. how to handle the plant.
   b. how to prepare the hole.
   c. how to prepare the back fill.
   d. how to prepare the tree or shrub.
   e. how to position the plant.
   f. how to water the plant.
   g. how to complete the planting.

   Be prepared to pass a quiz on the information.

9. Practice planting a balled and burlapped plant. Check with your instructor after each major step listed in Learning Activity 8. When your work is satisfactory, go on to Learning Activity 10.

10. Attend a lecture/demonstration by your instructor on Planting Container Grown Plants. Take notes to make sure you know:
    a. how to lift and carry the plants.
    b. the types of containers used in which plants are grown.
    c. how the plants are removed from each type of container.
    d. when bare root plants should be planted.
    e. how to store and protect the plants.
    f. how to prepare the hole.
    g. how to prepare the back fill.
    h. how to prepare the tree or shrub.
    i. how to position the plant.

    Be prepared to pass a quiz on the information.

11. Practice planting a container grown plant. Check with your instructor after each major step listed in Learning Activity 10. When your work is satisfactory, ask for the evaluation.

EVALUATION

Given a tree and/or shrub, the equipment and supplies you will need, plant the trees and/or shrubs. The shrubs and/or trees must be planted in holes twice the diameter of the root system and 6 inches deeper than the root system. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 07 Planting trees and shrubs

COMPETENCY 02 Form ball and burlap shrubs and trees

PERFORMANCE GUIDE

1. Check ball of soil on root system of shrub or tree to determine that it is firm and not broken.
2. Wrap burlap tight around ball of soil.
3. Pin burlap with nails as it is being wrapped.
4. Gather burlap around stalk or trunk of shrub or tree.
5. Secure burlap around ball of soil with grass string and tie it off around the stalk or trunk of the shrub or tree.

LEARNING ACTIVITIES

1. Read "Balled and Burlap" pages 238-339 and "Wrapping" on page 341 in Introductory Horticulture. Visit an agribusiness in your area to find out:
   a. cost and availability of tree wrap
   b. advantages/disadvantages of using tree wrap versus burlap
   c. cost and availability of burlap.

   Report your findings to the class.

2. Attend a lecture/demonstration by your instructor on forming ball and burlapping shrubs and trees. Take notes to help you pass a quiz on the information.

EVALUATION

You will be given shrubs and/or trees and the equipment and supplies you will need. Ball and burlap the shrubs and trees. When you are finished, there must be no exposed roots or spillage of soil coming from the burlapped ball. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 07 Planting Trees and Shrubs

COMPETENCY 03 Transplant trees and shrubs

PERFORMANCE GUIDE

1. Make a trench around the plant to be transplanted.
2. Pull loosened soil away from plant.
3. Cut the ends of the roots.
4. Lift wall of soil and plant from the hole.
5. Ball and burlap the plant.
6. Plant in new location.

LEARNING ACTIVITIES

1. Attend a lecture by your instructor on harvesting trees and shrubs using ball and burlap method. Take notes to make sure you know:
   a. how to prepare the plant for digging .
   b. how to dig the stock.
   c. how to transport the plant.

   Be prepared to pass a quiz on this information.

2. Read pages 3-7 in Ornamental Horticulture: Harvesting and Planting Trees and Shrubs. Your instructor will assign you specific trees for you to plan their transplant. In your report include the following information:
   a. minimum ball size
   b. time to move the plant
   c. steps to dig the plant
   d. how to transport
   e. how to store plant
   f. when and how to plant the tree/shrub

3. Read pages 8-9 in Ornamental Horticulture: Harvesting and Planting Trees and Shrubs. Your instructor will assign you trees and shrubs for you to plan their transplant using the bare root method. Include the following in your report:

   a. how to puddle the roots.
   b. how to transport the plant.
   c. heeling-in procedures.
   d. when and how to plant the tree/shrub.

4. Practice digging a tree or shrub. Check with your instructor after each major step listed above in the Performance Guide. When you are ready, ask for the Evaluation.

EVALUATION

You will be given a tree or shrub to transplant. You must receive a satisfactory rating on each item of the Student Checklist below.

STUDENT CHECKLIST

	Satisfactory	Unsatisfactory
1. Plant dug correctly		
2. Correct harvesting method chosen		
3. Roots protected		
4. Tree/shrub transplanted correctly		

STUDENT COMPETENCY SHEET

MODULE 07 — Planting Trees and Shrubs

COMPETENCY 04 — Brace newly planted trees

PERFORMANCE GUIDE

1. Determine the length of stake.
2. Cut stake to length.
3. Drive stake 2' into ground 6" from tree trunk on windward side of tree. After stake has been driven into ground, its top should be about midpoint of tree trunk.
4. Tie tree to stake in three places with leather rope or other material which will not cut bark of tree. Trunk should stand straight and may be wrapped, then tied with wire.

LEARNING ACTIVITIES

1. Read pages 341-342 in Introductory Horticulture and answer the following questions:

   a. Why are trees staked?
   b. Why is the type of material used to tie the tree important?
   c. How long do you leave the tree staked?
   d. What can happen if you leave the stakes on too long?

   Check your answers with your instructor. If they are satisfactory, go on to Learning Activity 2.

2. Attend a lecture/demonstration by your instructor on staking bare root trees. Take notes to make sure you know:

   a. how many stakes to use.
   b. how far to drive the stakes into the ground.
   c. how to secure trees to the stakes.

   Be prepared to pass a quiz on the information.

3. Practice staking bare root trees. Check with your instructor after each major step listed in the Performance Guide. When your work is satisfactory, go on to Learning Activity 4.

4. Attend a lecture/demonstration by your instructor on guying balled and burlapped plants. Take notes to make sure you know:

   a. definition of "guy".
   b. purpose of guying.
   c. how many stakes to use.

d. how far to drive the stakes into the ground.
e. how to secure the tree to the stakes.

Be prepared to pass a quiz on the information.

5. Practice guying balled and burlapped trees. Check with your instructor after each major step listed in the Performance Guide. When your work is satisfactory, ask for the evaluation.

EVALUATION

You will be given a wooden stake, sledge hammer and tying materials. Brace a newly planted tree which is 2" or less in diameter. The stake should not damage bark and the tree must not lean when 10 to 20 pounds of force is applied halfway up the tree trunk. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 08 — Pruning

COMPETENCY 01 — Trim and prune trees for balance, decorative and vegetative purposes.

PERFORMANCE GUIDE

1. Inspect tools and/or equipment to determine if they are in working condition.
2. Select correct tool for each particular cut.
3. Remove all dead, diseased or injured wood.
4. Remove wayward branches.
5. Lower or raise crown of tree, using pruning techniques.
6. Shape tree.
7. Thin crown.
8. Seal all large cuts with antiseptic compound.

LEARNING ACTIVITY

1. Watch the film strip "The Elements of Pruning" and answer the study questions given to you by your instructor. When you are finished check your answers with another student. If you disagree, ask your instructor for the correct answer.

2. Attend a lecture/demonstration by your instructor on pruning tools. You must be able to identify these tools and their uses.
   a. pruning saw
   b. lopping shears
   c. hand shears

3. Read pages 375-379 in Introductory Horticulture. Answer the following:
   a. Why are plants pruned?
   b. Define thinning.
   c. When is thinning used?
   d. List two trees that need thinned often.
   e. In your own words describe how to thin a tree.
   f. Define "heading back".
   g. Why is the "heading back" method used?
   h. List two trees you might "head back".
   i. Define renewal pruning.
   j. In your own words, describe the way you perform renewal pruning.
   k. Define root pruning.
   l. List the major steps in root pruning.

   When you are finished check your answers during a class discussion.

4. Read pages 5-9 in Ornamental Horticulture: Pruning. You may use this material as a reference for Learning Activities 5.

5. Make sketches of the following:

   a. example of incorrect cuts.
   b. example of correct cuts on large branches.
   c. example of weak and strong crotch.
   d. example of good scaffolding.
   e. example of correct cuts in relation to buds.

6. Read PRUNING AND TRAINING FRUIT TREES Misc. Pub. 480 WVU.
   Answer the following:
   a. Define crotch angle.
   b. What is the best branch angle to support heavy crops of fruit?
   c. Why are limb spreaders used?
   d. How are limb spreaders used?
   e. Define water sprouts.
   f. Define water suckers.

   Check your answers with your instructor.

7. Attend a lecture/demonstration by your instructor on making pruning cuts. Take notes to make sure you know:
   a. which branches are leaders and laterals.
   b. which branches destroy symmetry.
   c. selection of wide angle branches.
   d. spacing scaffolds.
   e. where to cut stems (inside or outside).
   f. how to cut limbs bigger than 1" in diameter.
   Be prepared to pass a quiz on this information.

8. Your instructor will assign you three trees which need pruning. For each tree complete the following:
   a. describe when you will prune the trees.
   b. explain reasons for pruning.
   c. identify laterals to be removed by tying them with yellow ribbon.
   d. identify branches which should be headed back by tying them with red ribbons.
   e. identify branches for permanent scaffolds by tying them with white ribbons.
   f. on the branches to be cut, trace your cut with black ink or paint. Check your work with your instructor as you complete each step for each tree.
   g. practice pruning your trees you used in Learning Activity 7. Check your work with your instructor after each major step. When your work is satisfactory ask for the Evaluation.

EVALUATION

Given a tree greater than 1½" in diameter which needs pruning and the equipment and supplies you will need, you will prune the tree. Cuts should be clean and flush to the leader with no splits evident. You must observe all safety precautions. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 08 Pruning

COMPETENCY 02 Prune shrubs for balance, decorative and vegetative purposes

PERFORMANCE GUIDE

1. Inspect tools to see if they work properly and are sharp.
2. Remove all diseased branches on shrub.
3. Remove suckers.
4. Remove broken and dead branches.
5. Remove asymmetrical growth.
6. Remove duplicate branches.
7. Seal large cuts with antiseptic compound.

LEARNING ACTIVITIES

1. Watch the film strip "The Elements of Pruning" and answer the study questions given to you by your instructor. When you are finished check your answers with another student. If you disagree, ask your instructor for the correct answer.

2. Attend a lecture/demonstration by your instructor on pruning tools. You must be able to identify these tools and their uses.
   a. pruning saw
   b. lopping shears
   c. hand shears

3. Read pages 375-379 in Introductory Horticulture. Answer the following:
   a. Why are plants pruned?
   b. Define thinning.
   c. When is thinning used?
   d. List two trees that need thinned often.
   e. In your own words describe how to thin a tree.
   f. Define "heading back".
   g. Why is the "heading back" method used?
   h. List two trees you might "head back".
   i. Define renewal pruning.
   j. In your own words, describe the way you perform renewal pruning.
   k. Define root pruning.
   l. List the major steps in root pruning.

   When you are finished check your answers during a class discussion.

4. Read pages 14-15 in Ornamental Horticulture: Pruning and answer the following:
   a. When is the best time for pruning shrubs?
   b. What type of cuts do you make on the shrubs?

c. Why do you prune shrubs?
d. How are evergreens different than deciduous shrubs when it comes to pruning techniques?

Check your answers with your instructor. If they are satisfactory, go on to Learning Activity 5.

5. Read pages 16-17 "Pruning Tips" in Ornamental Horticulture: Pruning. Be prepared to pass a quiz on the information.

6. Attend a lecture/demonstration by your instructor on pruning shrubs. Take notes to make sure you know how to:
   a. Remove diseased/damaged branches.
   b. Remove asymmetrical growth.
   c. Remove duplicate branches.

7. Your instructor will assign you three shrubs which need pruning. For each shrub complete the following:
   a. Describe when you will prune the shrub.
   b. Explain reasons for pruning.
   c. Identify diseased/damaged branches to be removed by tying them with yellow ribbons.
   d. Identify branches which should be headed back by tying them with red ribbons.
   e. Identify asymmetrical growth to be removed with blue ribbons.
   f. Identify duplicate branches to be removed with green ribbons.
   g. Trace the place you will make each cut with black ink or paint.

   Check your work with your instructor as you complete each step for each tree.

8. Practice pruning your shrubs you used in Learning Activity 7. Check your work with your instructor after each major step. When your work is satisfactory, ask for the evaluation.

EVALUATION

You will be given a shrub with branches 3/4 to 1½ inches in diameter which has been left alone for one year. Prune the shrub. Cuts must be made ¼" above a bud, small side of branch or main branches. Remaining growth should be well balanced with available sunlight spaces.

STUDENT COMPETENCY SHEET

MODULE 08 — Pruning

COMPETENCY 03 — Prune hedge for balance, decorative and vegetative purposes

PERFORMANCE GUIDE

1. Inspect tools to see if they work properly and are very sharp.
2. Determine desired size and shape of hedge plants. Hedge should be cut slightly undersized.
3. Remove all growth using proper tools.

LEARNING ACTIVITIES

1. Watch the film strip "The Elements of Pruning" and answer the study questions given to you by your instructor. When you are finished check your answers with another student. If you disagree, ask your instructor for the correct answer.

2. Attend a lecture/demonstration by your instructor on pruning tools. You must be able to identify these tools and their uses.
   a. pruning saw
   b. looping shears
   c. hand shears

3. Read pages 375-379 in Introductory Horticulture. Answer the following:
   a. Why are plants pruned?
   b. Define thinning.
   c. When is thinning used?
   d. List two trees that need thinned often.
   e. In your own words describe how to thin a tree.
   f. Define "heading back".
   g. Why is the "heading back" method used?
   h. List two trees you might "head back".
   i. Define renewal pruning.
   j. In your own words, describe the way you perform renewal pruning.
   k. Define root pruning.
   l. List the major steps in root pruning.

   When you are finished check your answers during a class discussion.

4. Attend a lecture/demonstration by your instructor on pruning hedges. Take notes to make sure you know:
   a. When to begin pruning hedges.
   b. How often hedges need pruning.
   c. How to determine the shape to prune the hedge.
   d. Safety precautions when using electric hedge shears.

5. Your instructor will assign you three hedges which need pruning. For each hedge complete the following:
   a. sketch how the hedge will look after pruning.
   b. Describe what size the hedge will be after pruning.
   c. Describe the tools you will use, and the cuts you will make.

   If your work is satisfactory, go on to Learning Activity 6.

6. Practice pruning the hedges you used in Learning Activity 5. Check your work with your instructor after each major step. When your work is satisfactory, ask for the Evaluation.

EVALUATION

You will be given a row of established hedge plants in need of shaping. Prune the hedge to desired size using electric and hand hedge shears. The hedge should be shaped to permit light to stimulate growth on all areas of the hedge. You may not use any references and you must observe all safety precautions.

STUDENT COMPETENCY SHEET

MODULE 08 Pruning

COMPETENCY 04 Train shrubs and hedges for special purposes including espalier effect, topiary effect and bonsai effect.

PERFORMANCE GUIDE

1. Determine final size and form of plant.
2. Construct frame.
3. Prune plant.
4. Secure branches.
5. Prune plant as growth occurs.

LEARNING ACTIVITIES

1. Attend a lecture by your instructor on espaliering. Take notes to make sure you know:
   a. plants to select for espaliering.
   b. common espaliering patterns.
   c. how to train the plants.
   d. materials to use for frames.

You must pass a quiz on the above information with 90% accuracy.

2. Construct a frame for espaliering using one of the patterns below. The layout should match the final shape you desire.
   a. single vertical
   b. single, double, or tiered cordon
   c. U or double U
   d. palmlate or oblique palmlate
   e. oblique
   f. belgian fence
   g. goblet
   h. informal or formal fan
   i. modern formal

3. Describe the steps you will take to espalier a plant in the form you built in Learning Activity 2. Include the following:
   a. the plant you will use
   b. trim schedule
   c. pruning techniques
   d. sketches of plants progress over one years time.

4. Attend a lecture by your instructor on topiary effect or pleaching Take notes to make sure you know how:
   a. prune the trunk of the plant
   b. prune the branches
   c. interweave branches
   d. common frames to support the plants.

You must pass a quiz on the information with 90% accuracy.

5. Describe the steps you will take to train a plant for topiary effect (pleaching) include
   a. the plant you will use
   b. time schedule
   c. pruning techniques

6. Prune and interweave a plant to match a shape given to you by your instructor. Remove all the excess branches and weave the branches. When your work is satisfactory, go on to Learning Activity 7.

7. Read pages 254-264 in Introductory Horticulture and complete the self evaluation on page 264. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity 8.

8. Select a plant and with another student, prepare a bonsai planting. You may use the book as a reference. Check your work with your instructor after each major step. When your work is satisfactory ask for the evaluation.

EVALUATION

You will be given plants, design and equipment. Prune the plant and construct the form to fit the desired shape and form. You may not use references. All excess must be removed and all plant shoots must be in a stationary position.

STUDENT COMPETENCY SHEET

MODULE 09 Tree and Shrub Care

COMPETENCY 01 Treat tree wounds

PERFORMANCE GUIDE

1. Clean and smooth cut area using a pruning knife.
2. Apply tree paint, filling pores and covering all exposed areas.
3. Check treated area later to make sure tree wound is not decaying.

LEARNING ACTIVITIES

1. Visit an agribusiness in your area and list the products on the market for treating tree wounds. Report to the class which product you feel is the best and why.

2. Attend a lecture by your instructor on tree wounds. Take notice to make sure you know the following:
   a. definition of tracing
   b. definition of callus
   c. treating split bark on lower trunk and limbs
   d. definition of slime flux
   e. how to treat broken branches

   Be prepared to pass a quiz on the information.

3. Practice treating tree wounds. Your instructor will assign you a tree to use which has been damaged. Check your work after each major step. When you are ready, ask for the evaluation.

EVALUATION

You will be given a freshly pruned tree 1" or greater in diameter and a pruning knife. Apply a coat of antiseptic tree paint to all exposed pruned areas. Periodic observations of the treated areas should reveal that the tree wound is not decaying.

STUDENT COMPETENCY SHEET

MODULE 09 Tree and Shrub Care

COMPETENCY 02 Inject preservatives and fillers

PERFORMANCE GUIDE

1. Select the tools
2. Determine if cavity is to be filled
3. Clean out bad wood
4. Treat cut edges
5. Disinfect cut surfaces
6. Coat with permanent tree paint or dressing
7. Select fill if necessary
8. Fill cavity

LEARNING ACTIVITIES

1. Go to the library and make a report on how cavities start. Present your report to your class. It may be oral or written.

2. Read student handout 09/02/01 "How to Treat Cavities". Keep this fact sheet in front of you during a lecture by your instructor. Be prepared to pass a quiz on the information.

3. Attend a lecture by your instructor on whether or not to fill a cavity. Take notes to explain how each of the following factors could help you make up your mind:
   a. size of cavity.
   b. age of tree.
   c. vitality of the tree.

   Your instructor will assign you a tree. Tell whether or not you would fill the tree and why. Present your report to the class.

4. Attend a lecture by your instructor on filling a cavity. You must be able to:
   a. tell the differences in the steps of treating a cavity which is not to be filled.
   b. select a good filling material
   c. fill a tree cavity.

5. Treat the tree you were given in Learning Activity 3. Check with your instructor after each major step. When you are ready, ask for the evaluation.

EVALUATION

You will be given a tree with a cavity. Write the procedures

you will follow to save the tree. Your report must defend your chosen treatment. Your instructor will review your report. If it is satisfactory, you will be given the equipment and supplies you will need. Follow the procedures outlined in your report.

STUDENT HANDOUT 09/02/01

TREATING CAVITIES

The following facts will help you decide which steps you should follow in treating cavities.

1. It used to be that people filled cavities with solid materials. This is beginning to change. People are now beginning to leave the cavity open after it has been cleaned, sterilized and painted.

2. To clean the cavity you need a rubber mallet, chisel, gouges with curved edges and a knife.

3. Remove all discolored and watersoaked wood from small cavities.

4. Shape the cavity so there are no water pockets. If it cannot be helped, shape the cavity so that it drains.

5. Shape the bark on the sides of the cavity as parallel to the line of sap flow as possible.

STUDENT COMPETENCY SHEET

MODULE 09 — Tree and Shrub Care

COMPETENCY 03 — Select and apply fertilizer to trees and shrubs

PERFORMANCE GUIDE

1. Punch 2" diameter holes 12" apart within 2' outside dripline of tree or shrub
2. Determine approximate amount of fertilizer for each hole
3. Equally distribute fertilizer in each hole
4. Irrigate holes thoroughly
5. Cap each hole with soil

LEARNING ACTIVITIES

1. Watch the film strip "Fertilizing Ornamental Plants". Complete the questions given to you by your instructor. If your work is satisfactory, go on to Learning Activity 2.

2. Read pages 342 and 353 "Fertilizing" in Introductory Horticulture. Using the formula "2 pounds for 1 inch diameter of the trunk 3 feet above ground level," compute how much fertilizer you will need for six different trees in your area.

3. Pass a quiz on the formula for computing the amount of fertilizer needed.

4. Attend a lecture/demonstration by your instructor on fertilizing trees and shrubs. Take notes to make sure you know:
   a. how to identify the drip line of the tree.
   b. how deep to make the holes.
   c. equipment needed.
   d. how to space the holes around the tree.
   e. how to make sure you get the same amount of fertilizer in each hole.

5. Your instructor will assign you three trees to fertilize. Before you do any work report:
   a. how much fertilizer you will use and why.
   b. the depth and spacing of the holes.
   c. how much fertilizer you will put in each hole.

   After your report has been approved, fertilize your trees. Check your work with your instructor after each major step. When you are ready, ask for the evaluation.

EVALUATION

You will be given an established tree to fertilize. Compute the amount of fertilizer and apply it equally to root area and 2' beyond the drip line of the tree. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 09 — Tree and Shrub Care

COMPETENCY 04 — Apply insecticides and other chemicals by power sprayer to trees and shrubs.

PERFORMANCE GUIDE

1. Determine the insecticide you will need using charts.
2. Read label of insecticide.
3. Mix insecticide according to directions if required.
4. Prepare sprayer for application of chemical.
5. Spray plants using manufacturers instructions for using sprayer.
6. Cover all pests, and upper and lower leaf surfaces.
7. Dispose of empty container following state regulations.
8. Store chemical, following state regulations.
9. Clean all equipment with water.

LEARNING ACTIVITIES

1. View the filmstrip "Controlling Pests of Ornamental Plants". Answer the questions given to you by your instructor. When your answers are correct go on to Learning Activity 2.

2. View the filmstrip "Applying Pesticides: Recognizing Pests and Pesticides". Be prepared to pass a quiz on the following:
   a. the parts of an adult insect
   b. the four stages of insect development

3. Read pages 107-108 "How Insecticides Attack Insects" in Working in Plant Science. When you are finished reading, list three examples of insects that can be killed by using:
   a. stomach poisons
   b. contact poisons
   c. fumigant poisons
   d. systemic poisons

4. Attend a lecture by a County Extension Agent on insects which damage trees and shrubs. Take notes to make sure you know the most common insects, how to identify them, and the chemical which can kill them. Be prepared to pass a quiz on the information.

5. Your instructor will assign you trees and shrubs which have been damaged by insects. Report on the type of insect and the chemical you will use to kill the insects.

6. View the filmstrip "Applying Pesticides: Type and Size of Spray to Use". Answer the questions on page 13-14 in the student workbook. Check your answers with your instructor.

7. Attend a lecture/demonstration by your instructor, "Preparing the Sprayer for Operation". Practice the following steps until you are ready for your instructor to check your work:
   a. Lubricate the spray.
   b. Inspect the pump, tank nozzles, strainers, hoses, piping and gauges.
   c. Adjust the nozzle spacing and height.
   d. Adjust the operating pressure.
   e. Check the sprayer for proper operation.

EVALUATION

You will be given trees and/or shrubs infested with either chewing or sucking insects. Apply a chemical which will kill the insects. The plant growth must not be retarded by the chemical. The chemical must not be allowed to come in prolonged contact with skin, or drift to animals, food sources or water sources.

STUDENT COMPETENCY SHEET

MODULE 09 — Tree and Shrub Care

COMPETENCY 05 — Prepare and protect trees and shrubs from weather.

PERFORMANCE GUIDE

1. Determine type of plant to be protected.
2. Measure for shading device/frost cap.
3. Layout and cut material to length and shape.
4. Position device over plants.
5. Store for later use.

LEARNING ACTIVITIES

1. Attend a lecture/demonstration by your instructor on constructing portable caps. Take notes to make sure you know how to:
   a. take measurements for each cap.
   b. layout and cut material.
   c. make folds in the material.
   d. form folds into caps.

   Your instructor will give you plants to use. Practice making the caps, checking with your instructor after each major step. When your work is satisfactory, go on to Learning Activity 2.

2. Attend a lecture/demonstration by your instructor on portable shading devices. Take notes to make sure you know how to:
   a. take measurements for each shading device.
   b. layout and cut material to size.
   c. assemble materials.
   d. put device over plants.

   Your instructor will give you plants to use. Make portable shading devices for each plant. Check with your instructor after each major step. When your work is satisfactory, go into Learning Activity 3.

3. Attend a lecture/demonstration by your instructor on wrapping trees and shrubs from the weather. Take notes to make sure you know:
   a. which trees/shrubs need to be wrapped.
   b. how high to wrap the tree/shrub.
   c. which materials to use.
   d. how to secure the wrapping.

   Your instructor will give you a tree/shrub to wrap and the materials. Wrap the tree/shrub and check with your instructor after each major step. When your work is satisfactory, ask for

the evaluation.

EVALUATION

You will be given a tree, shrub and a garden plant. Prepare the plant for cold weather and harsh sunlight. You must receive a satisfactory rating on each item of the Student Checklist below. You may not use references.

STUDENT CHECKLIST

	Satisfactory	Unsatisfactory
1. Measured plant for cap		
2. Measured plant for shading device		
3. Cut and layed out material		
4. Formed Caps		
5. Assembled shading device		
6. Selected material for wrapping		
7. Wrapped tree/shrub		
8. Secured wrapping		

STUDENT COMPETENCY SHEET

NODULE 10 — Planting and Care of Flowers

COMPETENCY 01 — Plant and transplant annual and perennial flowers.

PERFORMANCE GUIDE

1. Check soil for proper moisture and mixture.
2. Dig hole to about twice the width of the root ball and slightly deeper than the root ball.
3. Cut both sides of container for removal of plant.
4. If root ball is compacted, pull root ends from ball without damage to roots.
5. Set plant into hole and fill in under and around root ball. Top of root ball should be flush with the contour of seed beds.
6. Soak filled hole with water.
7. Construct shading devices to protect plant from hot sun.

LEARNING ACTIVITIES

1. Read pages 281-287 in Introductory Horticulture. Make a notebook for each annual flower listed on the Planning Chart. Include either a picture or a color drawing of the flower.

2. View the filmstrip "Annuals, Perennials and Houseplants". Be prepared to pass a quiz on the information.

3. Read pages 289-291 in Introductory Horticulture. Follow the steps outlined and sow annual seeds. Check your work with your instructor after each major step.

4. Read pages 292-298. Prepare a notebook for the chart of perennial flowers. For each flower listed, you must have a picture or color sketch.

5. Pass a quiz on the identification of perennial flowers. You must score at least 90% on the quiz.

6. Attend a lecture by a landscape architect on flower beds. Select an area around your school, choose the flowers and plant the bed. Check your work with your instructor after each major step. When you are ready, ask your instructor for the Evaluation.

EVALUATION

You will be given annual and/or perennial flowers in a container, water supply and a seedbed. Plant the flowers. The leaves, stems and root of the plants must not be broken during the planting process. A visual inspection after six hours must show the plants have not wilted.

STUDENT COMPETENCY SHEET

MODULE 10 — Planting and Care of Flowers

COMPETENCY 02 — Select and apply fertilizer to annual and perennial flowers.

PERFORMANCE GUIDE

1. Select plants to be fertilized.
2. Select fertilizer to be used.
3. Apply fertilizer at recommended rates.
4. Water thoroughly after fertilizing.

LEARNING ACTIVITIES

1. Read pages 288-289 "Fertilizing" and page 292 "Soil Preparation and Transplanting" in Introductory Horticulture. Answer the following questions:
   a. How much fertilizer do you use when you are preparing the bed?
   b. What type of fertilizer do you use if the plant does not look healthy?
   c. What is the advantage of using a soluable fertilizer?

   When you are finished, check your answers with your instructor. If they are satisfactory, go on to Learning Activity 2.

2. Visit an agribusiness in your area. Make a list of all of the annual and perennial fertilizers available. Compare the directions for use and decide which fertilizer you feel is the best to use. Defend your choice in a class discussion.

3. Describe the amounts, time, and type of fertilizer you would use for flowers given to you by your instructor. You may use references. When your work is satisfactory, ask for the evaluation.

EVALUATION

You will be given a flower bed, soil analysis and a variety of fertilizer. Mix and apply the correct amount of fertilizer to the flowers. You may use references.

STUDENT COMPETENCY SHEET

MODULE 11 — Flower Care

COMPETENCY 01 — Control weeds in flower beds by cultivating and hand weeding.

PERFORMANCE GUIDE

1. Determine hardness of soil. If soil is hard, soften with sprinkled water.
2. Take shallow, short strokes with hoe to uproot weeds and grass.
3. Pull weeds by hand that are growing too close to plants.
4. Using hoe, rake weeds and grass to edge of bed.
5. Dispose of weeds and grass.
6. Add new soil in holes created by uprooting weeds and grass.
7. Rake surface of flower bed with hoe or rake until smooth.

LEARNING ACTIVITIES

1. In a small group, write a definition for "weed". When you agree on a definition, compare it to another small group. As a class, decide upon your definition of a weed.

2. Study a flower garden. Sketch each of the weeds you find. Identify each one. If you have any trouble, ask your instructor for help.

3. Follow the steps in the Performance Guide above and practice weeding flower beds. Check your work with your instructor after you complete each step. When you are ready, ask for the Evaluation.

EVALUATION

You will be given a hoe and a rake, remove unnecessary weeds from an unmulched flower bed. The topsoil must be left smooth and flowers should not be bruised or uprooted.

STUDENT COMPETENCY SHEET

MODULE 11 — Flower Care

COMPETENCY 02 — Apply insecticides and other chemicals by hand sprayer and duster to annual and perennial flowers.

PERFORMANCE GUIDE

1. Determine the disease or pests to be controlled or prevented.
2. Select proper chemical to be used.
3. Check chemicals for toxicity and precautions to use.
4. Place chemicals in duster or sprayer.
5. Dust and/or spray plants according to manufacturers recommendations.
6. Repeat dusting/spraying as problem requires to control or prevent disease or pests.

LEARNING ACTIVITIES

1. View the filmstrip "Applying Pesticides: Recognizing Pests and Pesticides". Be prepared to pass a quiz on the following information:
   a. the parts of an adult insect.
   b. the four stages of insect development.

2. View the filmstrip "Applying Pesticides: Operating Sprayers". Answer the questions on page 15, 20 and 21 in the student workbook. When you are finished check your answers with your instructor.

3. Attend a lecture/demonstration by your instructor on preparing the sprayer for operation. Practice until you are ready for the instructor to check your work.

4. Attend a lecture/demonstration by your instructor on using a duster. Take notes to make sure you can use a duster safely. When you are ready ask your instructor to observe your using the duster.

5. Attend a lecture by your County Extension Agent on common insects which damage flower beds. Take notes to make sure you can identify the insect, and the chemical to use to control it. Be prepared to pass a quiz on the lecture.

EVALUATION

You will be given a flowerbed. Determine which insects need to be controlled. Choose the chemical and apply it to the plants using a duster or hand sprayer. The plants must show evidence of insect control within the time claimed on the label. You must observe all safety precautions. You may use references.

STUDENT COMPETENCY SHEET

MODULE 12 — Tool Maintenance

COMPETENCY 01 — Maintain hand tools used in gardening and landscaping.

PERFORMANCE GUIDE

1. Use solvent, tool, or other methods required to remove foreign material from tool.
2. Clamp tool securely in vise.
3. Remove gaps from cutting edge of tools.
4. Sharpen tools, maintaining original level. CAUTION - If using a hand file, grip file firmly and take short strokes to prevent hand injuries on tool cutting edge.

LEARNING ACTIVITIES

1. List the hand tools you feel are necessary for gardening and landscaping. Compare your list with another student. Add and/or subtract from your lists until you agree on one list of handtools.

2. Visit an agribusiness in your area and list all the commercial products you can buy to clean hand tools. Talk to a gardner or landscape worker and compare the products they use to clean tools with the products on the market. Report your findings to the class.

3. Attend a lecture/demonstration by your instructor on sharpening tools. Take notes to make sure you know:
   a. how to use a vise.
   b. how to remove gaps from cutting edges.
   c. definition of level.
   d. safety precautions to follow.

   Be prepared to pass a quiz on the information.

4. Clean and sharpen tools given to you by your instructor. Check your work with your instructor after each major step. When you are ready, ask for the evaluation.

EVALUATION

You will be given the supplies you need for cleaning and sharpening tools. You will remove all foreign materials from a hoe and shovel and sharpen both tools. Gaps should be removed from the cutting edge of the hoe and shovel, and the original level of the cutting edge must be maintained.

STUDENT COMPETENCY SHEET

MODULE 12 — Tool Maintenance

COMPETENCY 02 — Perform operators' services and maintenance on tractor and rotary tiller.

PERFORMANCE GUIDE

1. Check and service engine and accessories.
2. Check and service transmission.
3. Check and service hydraulic system.
4. Check and service chassis.
5. Check and service tires.
6. Check and adjust tread width.
7. Check and adjust wheel weights.
8. Check and adjust seat.

LEARNING ACTIVITIES

1. Read pages 34-40 in Grounds Keeping Equipment. Be prepared to pass a quiz on the steps to follow when you check and service:
   a. crank case
   b. air cleaner
   c. battery
   d. cooling system
   e. fuel tank

2. Attend a lecture by your instructor on checking and servicing the engine of your rotary tiller. After the lecture practice inspecting the engine of your tractor and rotary tiller. Have your instructor observe your work. When it is satisfactory, go on to Learning Activity 3.

3. Read pages 41-44 in Grounds Keeping Equipment. Be prepared to pass a quiz on the steps to follow when checking the:
   a. transmission and hydraulic tractors
   b. belts and chains
   c. gear case for leaks
   d. fluid level
   e. cleaning filler cap or plug on hydraulics

4. Attend a lecture by your instructor on checking and servicing transmission and hydraulic systems on your equipment. Have your instructor observe you performing the checks. When your work is satisfactory, go on to Learning Activity 5.

5. Read pages 44-46 in Grounds Keeping Equipment. Sketch tires to show wear due to over inflation, under inflation, and correct inflation.

6. Read pages 48-50 in Grounds Keeping Equipment. Be prepared to pass a quiz on:
   a. reasons for adding weight to rear wheels.
   b. reasons to add weight to front wheels.
   c. three ways to add weight to the tractor.

7. Describe how and where you would put weight to the tractor for three problems given to you by your instructor. You must be 100% correct.

8. Read pages 50-53 in Grounds Keeping Equipment. When you are ready, show your instructor you know how to adjust the seat back, the height and/or weight of the seat; and the horizontal position of the seat.

9. Write the steps of the operator's services and maintenance in your own words. Use your guide and practice the services with your instructor observing your work. When you are ready, ask for the Evaluation.

EVALUATION

You will be given a tractor and/or rotary tiller. Your instructor has fixed the equipment with malfunctions. Find the malfunctions during your pre-operations check. Correct the malfunctions. You may use references. All malfunctions must be identified and corrected during the first inspection.

STUDENT COMPETENCY SHEET

MODULE 12 — Tool Maintenance

COMPETENCY 03 — Clean and adjust hand and power sprayers, dusters, and seeders.

PERFORMANCE GUIDE

1. Wear safety clothing and equipment.
2. Check label for any specific instruction.
3. Select a safe place for cleaning and flushing.
4. Drain the equipment tank or empty the hopper.
5. Remove nozzles and clean separately.
6. Flush system with water.
7. Flush system with mixture of water and light oil.
8. Store equipment in a dry place.

LEARNING ACTIVITIES

1. Read pages 91-93 in Applying Pesticides: Management Application Safety. Answer the following questions.
   a. Why is the place you select for cleaning and flushing important?
   b. When you drain the equipment tank or hopper, what do you do with the contents?
   c. When you flush granular equipment, what steps do you follow?
   d. What steps do you follow when trying to clean 2, 4-D from equipment?
   e. Why do you flush the equipment with light oil and water?
   f. What are the steps for cleaning spraying equipment?

   When you are finished, check your answers with your instructor. If they are satisfactory, go on to Learning Activity 2.

2. Attend a lecture/demonstration by your instructor on cleaning equipment which has used 2, 4-D. Take notes. Be prepared to pass a quiz on the different steps to follow when you are using Amines or Sodium Salts of 2, 4-D and Ester Forms of 2-4,D.

3. Attend a lecture/demonstration by your instructor in cleaning dusters and spreaders. In your own words write the steps to follow. Check your work with your instructor.

4. Clean and store equipment assigned to you by your instructor. For each piece of equipment, write the steps you will take and

any special considerations you have to give the equipment due to the chemical used. Have your instructor check your work. When it is satisfactory, ask for the evaluation.

EVALUATION

You will be given a piece of equipment and a description of the way it was used. Clean and store the equipment. You may use references. You must receive a satisfactory rating on each item of the student checklist below.

STUDENT CHECKLIST

	Satisfactory	Unsatisfactory
1. Safety clothing and equipment worn		
2. Safe place selected for cleaning and flushing		
3. Equipment tank and/or hopper drained		
4. Nozzles removed and cleaned		
5. System flushed		
6. Equipment stored		

STUDENT COMPETENCY SHEET

MODULE 12 — Tool Maintenance

COMPETENCY 04 — Set up, operate, and shut down portable watering and/or irrigation system, including extension of system.

PERFORMANCE GUIDE

1. Determine amount of water needed for plants.
2. Determine soil type and slope.
3. Determine if plants are established or newly planted.
4. Check equipment for proper working order.
5. Set-up watering equipment for proper coverage.
6. Turn on water and check for runoff.
7. Regulate water flow.
8. Check area frequently to maintain amount of water.

LEARNING ACTIVITIES

1. Read pages 72-82 in Working in Plant Science. Answer the questions on page 82. Check your answers during a class discussion.

2. Work the problems on pages 29-32 in Working in Plant Sciences Activity Guide. Check your answers with your instructor after you complete each activity.

3. Attend a lecture/demonstration by your instructor on installing sprinkler heads, nozzles, and other irrigation equipment. Take notes to make sure you know:
   a. how to calculate the spacing of sprinkler heads.
   b. how to install the main water lines.
   c. how to install the sprinkler heads.
   d. how to calculate cycle time.
   e. how to adjust sprinkler heads to apply water evenly to the area.

   Be prepared to pass a quiz on the information.

4. Install an irrigation system on an area assigned to you by your instructor. Check with your instructor as you complete each of these steps.
   a. sprinkler heads spaced.
   b. sprinkler system installed.
   c. cycle time calculated.
   d. sprinkler heads adjusted.

When you are ready, ask for the evaluation.

EVALUATION

You will be given an area, portable irrigation equipment and moisture testing device. Maintain sufficient moisture around the area for one month. You must receive a satisfactory rating on each item of the student checklist below.

STUDENT CHECKLIST

	Satisfactory	Unsatisfactory
1. Plants watered only when necessary		
2. Water was applied around plants at rate of absorption by soil		
3. Moisture level of soil around plants was always 6-8 inches		
4. Plants watered in early morning		